

## ABSTRACT

Described herein are apparatuses, methods and systems to monitor the performance of one or more mass flow controllers that supply gases to deposition, etching, and other manufacturing processes. A bypass loop is provided in fluid connection from either the process line or the vent line. In the bypass loop is a flow detector, such as a digitized mass flow controller. The flow detector takes one or more measurements of flow of gas from a mass flow controller, and data from such one or more measurements is used to provide information about the accuracy and/or precision of the mass flow controller. Also disclosed are ways to correct for back pressure or back vacuum in the process line.